Southern Pine BEETLE NEWS

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Site/Stand Workshop Held in Arkansas

ESPBRAP researchers, interested foresters, and pest management specialists participated in a site/stand workshop near Arkadelphia, Arkansas, on April 3-4, 1979. **The main purpose of the meeting was to review progress and to address problems in the development and validation of models for rating stand susceptibility to beetle attack.**

Following a discussion of current approaches to developing stand-rating models and a qualitative response model, representatives from each site/stand project reviewed their work. Such variables as stand density, diameter at breast height, tree growth-rate, stand age, and selected site/soil features consistently affected spot incidence.

Also discussed was the testing of stand-rating models. Investigators considered what validation is, why and how it is done, and who should do it. They concluded that validation ensures a rating system is effective under operational conditions. Ideas about using historical versus new data were discussed, as were sources and kinds of readily available resource data and categorical as opposed to probabilistic approaches.

Another part of the workshop dealt with implementing the stand-rating models. Several facts quickly became apparent: stand-rating systems must depend upon existing resource data, managers would like quick and simple approaches, and foresters are not willing to spend a great deal of time taking measurements or interpreting complicated data. It is important, therefore, that Program researchers simplify guidelines for stand-rating, and work with managers and field personnel to help them understand and implement the rating systems.

In a critique of the workshop, users acknowledged the value of Program site/stand work. But they also pointed out the need for ESPBRAP investigators to put their findings into understandable and useful form.

Crowding, Waterlogging Associated with SPB Attacks

Researchers in east Texas examined about 60 site and stand features for over 1000 sites, half of which were beetle infested and half of which were not. Among variables recorded were type of soil, amount of ground moisture, and stand density. Infested and uninfested stands were compared to see which factors were most frequently associated with beetle attack.

The results? Pines growing on chronically wet or waterlogged soils were prime targets for SPB. Trees on dry or droughty soil were attacked less often.

Overcrowded pines were also susceptible. Beetle-infested stands averaged 105 square feet of basal area per acre, while uninfested stands averaged only 70 square feet of basal area per acre.

The authors acknowledge that wet sites are a complex management problem, especially in the flatwoods of the Lower Coastal Plain, where they often occur as small pockets of poorly drained land. Little can be done to alter these soggy places and lessen the threat of beetle attack.

But thinning can help. A careful thinning to 60-80 square feet of basal area per acre cuts down on the likelihood of beetle attack. The recommended time for thinning is either early fall or winter, or at a time when there are few or no reports of beetle activity.

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Comparison of Methods For Estimating Beetle Populations

Researchers in southwest Arkansas compared three methods — X-ray, bark dissection, and examination of attack site (pitch tubes, entry route, and egg galleries) — for estimating attacking SPB populations. In July 1977, samples were taken from three loblolly pines with attack essentially complete but reemergence not started.

Bark dissection had an actual count of beetles and was the most accurate method. And figures for this method tallied closely with those from an examination of attack site. These two ways of estimating beetle population densities provided similar results for sample trees.

Counts from X-rays varied. Two workers — with differing amounts of experience reading X-rays of SPB — had conflicting opinions. The worker with the most experience only once varied significantly from estimates of the other two systems. The other worker was consistently lower, which suggests the need for highly trained personnel when using this method.

Both X-raying and bark dissection called for precise timing to catch SPB populations after completion of attacks but before reemergence started. Examination of attack site alleviated the problem but had a drawback of its own: evidence was blurred or wiped out by activity of beetle associates.

For each method, time of collection, preparation, and analysis varied. X-raying and bark dissection required samples with sapwood, which meant a longer time in the forest collecting samples. X-rays and development in the lab also took time, as did removal of sapwood for bark dissection. Time spent in analysis was greatest with the attack-site method, although it had the lowest collection and preparation times.

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Overstocking, Slow Growth Related to SPB Attack In Southern Appalachians

In 1957 and from 1975 to 1977, researchers studied stand, soil, and site characteristics of 68 beetle-infested natural stands in the southern Appalachians. For the later period, they compared data from 22 attacked plots with those from unattacked plots. Beetle activity for all phases of the study was at low level or declining.

Findings were similar for the two periods. Most attacked stands were densely stocked and had slow radial growth and a high proportion of overmature pine sawtimber. Although some infestations occurred in stands with low basal area, such stands had mature and slow-growing trees.

Shortleaf pine, pitch pine, and loblolly pine were more susceptible to beetle attack than were Virginia pine and eastern white pine. But there were no significant differences in age, size, and growth variables among live and SPB-killed pines. This indicates that SPB attack in this region was related to stand features rather than to individual tree characteristics.

Management implications: the authors recommend intermediate cuttings, favoring more resistant pine species (Virginia pine and eastern white pine), and favoring mixtures of pine and hardwoods. They note, however, that silvicultural practices cannot eliminate SPB attacks and that each region needs specific guidelines for reducing beetle damage.

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Task Force Meets

The Southern Pine Beetle Technology Transfer Task Force met in Alexandria on April 11, 1979. **Central to the discussion were the importance of Task Force activities to State and Private Forestry programs and the need to share research results with small, nonindustrial landowners and forest managers.**

How can this best be accomplished? The Task Force identified eight application areas and technology transfer teams for each area. The eight areas include socioeconomic guidelines, sampling methods and predictive models, guidelines for using SPB-killed timber, new insecticides and improved spray systems, aerial survey and navigation systems, silvicultural practices/stand rating, behavioral chemicals, and integrated management strategies.

The Task Force has selected team leaders for each

technology transfer area. The team leaders will review the needs of user groups and the information available in their areas, then recommend the most suitable means of communicating and implementing results of Program research.

The job of technology transfer clearly falls into two periods — the time remaining in the Program, when ESPBRAP resources can be used to support followup activities; and the time after the Program, October 1980 to September 1985, when other resources will be needed. Priorities for the first period were established for each of the eight application areas, while those for the second period will be set after Program results are reviewed in the spring of 1980.

Clerid Aggregation Studied

It has long been known that clerid adults *(Thanasimus dubius)* prey on attacking adult southern pine beetles, and that immature clerids feed on immature SPB under the bark. What was not so well known was the clerid's aggregation pattern on pines attacked by SPB. But now, research in Texas has given us valuable information on the clerid's sequence of arrival, height of occurrence, and activity at different times of the day.

Clerid patterns were like those of the SPB. Peak numbers of clerids arrived on the 4th day of an 11-day attack period; SPB arrival peaked on the 3rd day of the same period, then dropped off. Clerids arrived in increasing numbers until day 4. Arrivals then declined.

Time and temperature also played an important part in clerid aggregation. The predators were most active between 9:00 a.m. and 11:00 a.m., with a smaller peak in activity at 7:00 p.m. (Southern pine beetles were most active at 5:00 p.m.) There was little or no clerid movement when weather was cool (20.3°C) or hot (above 26.6°C).

Almost two-thirds of each of the two beetle species were found on the lower one-half of the tree. This finding, along with the similarities in periods of activity and distribution on the tree, indicates that the clerid has adapted its own aggregation behavior to that of its prey.

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Groundwork Laid For Stand Risk Classes

A study begun in 1975 and still underway on the Kisatchie National Forest is making headway towards an understanding of the beetle-attacked stand. Backing up results of earlier studies at Kisatchie and elsewhere, research on nearly 1,400 beetle spots suggests that a beetle risk classification system can be fashioned from available inventory data.

More precise results? Forest type, tree age and size, stand density, soil moisture, and site index are chief clues. A high percentage of beetle attacks happened in 35-year-old or older sawtimber stands of all forest types. Many infestations (59 percent) were associated with stand disturbances like wind or lightning damage. In addition, 81 percent of the attacks were on moist, wet, or waterlogged sites, and 72 percent on moist sites with high site index.

One approach based on readily available inventory data is already being developed and tested on the Kisatchie National Forest. Being used are forest type, tree size and age, site index, operablity, and method of cut.

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AN EQUAL OPPORTUNITY EMPLOYER

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